Biological Evaluation

of

Boswell Creek Watershed
Healthy Forests Initiative Project
BE 04-04-01

Walker and San Jacinto Counties, Texas

USDA Forest Service
National Forests and Grasslands in Texas
Sam Houston National Forest

October 2003

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I. Introduction

A. Purpose

During the mid 1980's the Sam Houston National Forest was affected by a Southern Pine Beetle (SPB) epidemic. Major infestations occurred in the Four Notch area (the central core of the Boswell Creek Watershed Project) which resulted in significant losses of pine. The Four Notch area has become a fragmented landscape consisting of large expanses of dense young pine stands with interspersed stands of mature pine. Pine stands within the project area, specifically young pine, occur primarily in high densities. Competition for water and sunlight inhibit crown size, thus delaying growth and reducing resin flow. Pine stands under these conditions become stressed, less tolerant to drought and encounter increased susceptibility to stand-replacing wildfire or SPB infestation. The purpose of the proposed project is to use thinning and prescribed fire in order to reduce the risk of wildfire and southern pine beetle hazard.

B. Objectives

This document is a site-specific Biological Evaluation (BE) to determine the effects of proposed management actions on **Proposed, Endangered, Threatened, and Sensitive (PETS) species**.

The objectives of this BE are to:

1. Determine the effects that the proposed action in Compartments 69, 70, 72, 73, 74, 75, 76, 77, 78, and 83 on the Sam Houston National Forest may have on PETS species.

2. Provide biological information to ensure U.S. Forest Service (USFS) and National Forests and Grasslands in Texas (NFGT) compliance with the National Forest Management Act (NFMA), National Environmental Policy Act (NEPA), Forest Service Manual 2670, Endangered Species Act (as amended), and 1996 Revised Land and Resource Management Plan for the NFGT.

C. Evaluation Methods

The evaluation is based upon:

1. Review of the literature related to the ecology of PETS species - see list of "References and Literature Cited" at the end of this document.

2. Review of the following documents:

   a. Red-cockaded Woodpecker Recovery Plan, second revision (U.S. Fish and Wildlife Service, 2003)
   b. Guidelines for Preparation of Biological Assessments and Evaluations for the Red-cockaded Woodpecker (U.S. Fish and Wildlife Service, 1989)
   c. Final Environmental Impact Statement for the Management of the Red-cockaded Woodpecker and its Habitat on National Forests in the Southern Region (USDA Forest Service, Southern Region, 1995)
   d. Revised Land and Resource Management Plan (USDA Forest Service, NFGT, 1996)

3. Review of Sam Houston National Forest PETS species records.

4. Field evaluation of habitat conditions in and near the project area.

II. <u>Proposed Management Actions</u>

A. Proposed Actions

The project area encompasses approximately 8,650 acres of the Sam Houston National Forest. Approximately 8,360 acres occur within Management Area 2 (MA-2), Red-Cockaded Woodpecker Emphasis, while about 290 acres consist of streamside management zones (MA-4). Of the approximately 8,360 acres in this project within MA-2, about 7,420 acres occur in pine dominated stands. The proposed project includes thinning approximately 4,800 acres of upland pine and prescribed burning approximately 7,420 acres of upland pine on a 2 to 5-year cycle. Thinning would be conducted on about 3,360 acres of young pine stands and on about 1,440 acres of older, mature pine stands. Thinning would likely begin in the summer of 2004 and would be expected to continue through 2008. Dormant season and growing season burning would be used to reduce fuels. The prescribed burning would begin in the winter of 2003. All acres would be expected to have initial prescribed burning completed by the spring of 2006.

B. Desired Future Conditions

The Revised Land and Resource Management Plan (*Plan*) emphasizes management actions in MA2 that produce habitat conditions that provide the best opportunity for the protection, enhancement, and recovery of the red-cockaded woodpecker population in Texas (USDA Forest Service 1996). The *Plan* states that desired future conditions will consist of "*open*

mature pine forest mixed with some hardwoods species." In addition, a frequent fire regime will exist that creates a more "*open, grass-like understory*."

III. Species Considered and Evaluated

A list of the PETS species considered and/or evaluated was derived from Appendix D of the Revised Land and Resource Management Plan (1996), the Regional Forester's Sensitive Species List (2001), and the U.S. Fish and Wildlife Service[1] (*website checked for updates on August 29, 2003*). Species for which viability is a concern, that are known or suspected to occur, or which have suitable habitat that may be affected by this proposal, are addressed in this BE. Following are definitions of categories to which species are assigned.

A. Federally Listed or Proposed Species

The U.S. Fish and Wildlife Service (USFWS) has determined that these species are threatened or endangered. Species in this category are protected under the Endangered Species Act (ESA). Federally proposed species are those species that have been proposed for listing, but for which listing is not yet final.

B. Sensitive Species

There is concern for population viability of these species across their range, and all occurrences contribute significantly to the conservation of the species. This category will often include former USFWS "category" species.

Requirements for when to conduct project-level inventories of Proposed, Endangered, Threatened, and Sensitive species were assessed using procedures outlined in Forest Service Manual 2672.43 (Supplement R8-2600-2002-2). Based on this assessment, affected potential habitat in the project area was inventoried for the presence of the red-cockaded woodpecker. See (Appendix A) for a listing of those species addressed in this evaluation and those that were considered but eliminated from detailed evaluation and the rationale therein. The following species were evaluated but not inventoried: Rafinesque's big-eared bat, southeastern myotis, Texas emerald dragonfly, Bachman's sparrow, western sand darter, Sabine shiner, Texas pigtoe, triangle pigtoe, sandbank pocketbook, Louisiana pigtoe, Texas heelsplitter, Neches crayfish, *Procambarus nigrocinctus* (no common name), and *Procambarus kensleyi* (no common name). Site-specific inventory of these species would not provide information that would improve project design or allow for a better assessment of effects to the viability of their populations. Therefore, expected effects were analyzed as if these species were present, or if their habitat would be affected by the proposed project.

Field evaluations and surveys for federally listed and sensitive species were conducted by trained Forest Service personnel from March 10 - 21, 2003. A visual inspection of pine stands 30 years or older were inspected for the occupation or use by PETS species. The surveys conducted for selected PETS species were adequate for the needs of this project.

[1] Arlington Field Office.
<http://ifw2es.fws.gov/EndangeredSpecies/Lists/ListSpecies.cfm?Operation=View+State+List&State=Texas/>

IV. Evaluation of Effects

A. Federally Listed Species

Red-cockaded Woodpecker (*Picoides borealis*)

The red-cockaded woodpecker (RCW) has a strong preference for open, fire-maintained mature pine stands with forb or grass dominated ground cover and a midstory relatively devoid of hardwoods (Jackson 1994, Conner et al. 2001). It excavates cavities in live pine trees, seeking out older (>80 yrs) trees infected with red heart fungus (*Phellinus pini*), thin sapwood and a large diameter of heartwood (Conner et al. 1994, Rudolph et al. 1995). A well developed midstory, resulting from a lack of fire, may make the woodpeckers more vulnerable to predation by creating a vegetation ladder past the resin barrier to the nest hole. Research has shown that RCW's are more likely to abandon individual cavity trees or entire clusters in areas where a tall hardwood midstory is present (Conner and Rudolph 1991).

The RCW population on the Sam Houston National Forest is classified as a Primary Core Population. This type of population is identified in recovery criteria as important to conserving RCW's in varied habitats and geographic regions, reducing threats of extinction, and delisting (USFWS 2003). The population is composed of three sub-populations, which include; the donor (west side), central, and east. The project area is located within the central sub-population.

The project area contains 19 inactive clusters and recruitment stands. An additional 12 clusters or recruitment stands possess foraging habitat within, but occur outside, the project area. There has not been an active RCW cluster within the project area since 1996. The last active cluster, in close proximity to the project area, was recorded in the spring of 2000. Systematic ground surveys for this species were conducted in the project area during the spring of 2003. Surveys, that involved walking transects spaced ≤200 feet apart, were performed by personnel trained in identification of the RCW by sight and sound, cavity trees, and starts. There were no RCW's or active clusters found. However, several previously undocumented cavity trees were discovered. The nearest active clusters are located approximately 2 miles from the project area in Compartments 67 and 80.

Approximately 2,567 of 7,420 acres of pine dominated stands in the project area are adequate foraging and nesting RCW habitat as determined by age class (≥60 yrs.). However, these pine stands do not meet the criteria of good quality foraging or nesting habitat due to high stand density and/or the occurrence of a moderate to well developed woody understory and/or hardwood midstory (USFWS 2003). Based on the RCW recovery plan, foraging habitat is currently limited for 20 of 31 clusters or recruitment stands that occur in, or that have foraging habitat within, the project area (see Appendix B). The proposed project will not result in the elimination of foraging habitat.

Direct and Indirect Effects

Thinning and prescribed fire would have no *direct* effects on RCW due to the absence of active clusters or known individuals within the project area, and the distance (approximately 2 miles) from the nearest active cluster.

The proposed project would reduce fuel loads, thereby lessening the susceptibility of RCW habitat to potentially catastrophic wildfire and SPB infestation. In addition, thinning and prescribed fire would improve RCW habitat.

Prescribed fire would impede the development of a woody understory and midstory, while promoting the establishment or expansion of herbaceous vegetation (see Appendix B). Thinning of the proposed stands would reduce basal areas and open the forest floor to sunlight, facilitating the establishment or improvement of habitat. Opening the canopy establishes a primarily grass and forb dominated ground cover, the preferred condition for cluster sites (Conner et al. 2001). Decreased canopy competition would result in the acceleration of pine growth, thereby reducing the time for trees to become available for foraging and nesting. Accelerated pine growth would result in increased diameters, larger crowns, increased resin production, and accelerated heartwood decay, enhancing the potential suitability of trees for foraging and cavity excavation.

Negative effects to RCW nesting habitat are possible due to the potential ignition of resin covered cavity trees during prescribed burning. However, the threat of cavity trees being harmed is minimized by preventative measures employed during prescribed burning operations (USDA Forest Service 1996, MA-2-80-3.3.3).

Cumulative Effects

The proposed project will move pine stands toward meeting the desired future condition of MA2 and developing the structural elements of good quality foraging habitat as outlined in the RCW recovery plan (USFWS 2003).

The project area is the main link between existing occupied habitat, located SE of the project area, and isolated habitat located NW of the project area. Improved habitat conditions within the project area would likely facilitate the future expansion of the central RCW sub-population. Providing suitable habitat creates a link between existing RCW groups and potential habitat NW of the project area, connecting otherwise inaccessible habitat. Given the relative spatial distribution of the national forest lands in or near the project area, isolation of any groups in adjacent compartments will be minimized. Therefore, habitat suitability in the project area is essential to RCW expansion throughout all available habitat of the central sub-population.

Expansion of the sub-population would benefit the SHNF population by reducing threats of extirpation from demographic stochasticity, environmental stochasticity, and inbreeding depression (USFWS 2003). Unfortunately, due to management practices, forests on adjacent private lands are unlikely to provide an additional link to existing habitat, and will consequently not contribute to the expansion of the RCW population. Expansion of the central RCW sub-population in or near the project is likely dependent solely on the maintenance or creation of suitable habitat on federal lands. Adjacent private lands consist primarily of open pasture and forested lands occurring NW and East of the project area. However, pine on these lands is currently being managed for short rotations (approximately 30 years), with management practices unlikely to change. Therefore, adjacent private lands are unlikely to produce habitat that will contribute or aid in expansion of the central RCW sub-population in the near future.

Determination of Effect

Red-cockaded woodpeckers were not detected during surveys and are unlikely to occur in the project area due to unsuitable habitat conditions. Thinning and prescribed fire would improve foraging and nesting habitat by moving pine stands toward developing the desired future conditions. Therefore, the proposed project is unlikely to adversely affect this species.

B. Sensitive Species

The following sensitive species are addressed: Rafinesque's big-eared bat, southeastern myotis, Texas emerald dragonfly, Bachman's sparrow, and several aquatic species.

Rafinesque's big-eared bat (*Corynorhinus rafinesquii*) and
Southeastern Myotis (*Myotis austroriparius*)

Rafinesque's big-eared bat and the southeastern myotis reach the western limit of their range in east Texas. These species are experiencing population declines because of the loss of adequate roosting habitat. In east Texas, these bats roost in a variety of places that may include; crevices behind loose bark, hollow trees, under dry leaves, caves, wells, old mine shafts, buildings and cisterns, or other protected cavities or structures (Davis and Schmidly 1994). The southeastern myotis prefers bottomland floodplain forests, lower-slope hardwood-pinelands, flatland hardwoods, and upper-slope pine-oak woodlands (Mirowsky and Horner 1997). Preliminary research on habitat associations for the Rafinesque's big-eared bat in eastern Texas indicates a preference for roosting within bottomland hardwood communities (Mirowsky and Horner 1997).

Direct and Indirect Effects

Thinning and prescribed fire may displace or harm individuals. However, due to the high mobility of these species, possible impacts are likely to be negligible. These bats do not hibernate in Texas and would therefore be more mobile and alert during winter, allowing for a higher likelihood of escape from an encroaching fire or other disturbing activity yearlong (Davis and Schmidly 1994).

Direct removal or incidental damage of snags may occur during timber harvest or prescribed burning. Prescribed burning would result in both the loss and production of snags (Van Lear 1993). This action is likely to cause a net reduction in the number of snags in upland sites. However, this habitat component would still exist in uplands and continue to provide bat habitat. In addition, snags are more frequent in lowlands and riparian zones than on upland sites (Van Lear 1993). Roosting habitat for these species is primarily located within low-lying areas of Streamside Management Zones (SMZ's), which thinning would not occur and tend not to carry fire well. Consequently, most roosting habitat is not likely to be impacted by the proposed project.

Cumulative Effects

Thinning and prescribed fire will have long-term benefits to these species by decreasing the susceptibility of pine stands to catastrophic events and by promoting the growth of pine. This will increase the chance of pine stands reaching an old age class that provides long-term roosting habitat.

The availability of suitable habitat for these species is limited on adjacent private lands. Human structures may provide some potential roosting habitat for these species if conditions are favorable. However, private lands are primarily composed of pasture or short rotation forest (approximately 30 years), with little chance of developing roosting habitat. Lands managed intensively for wood production generally have lower densities of snags than national forests (Van Lear 1993). With management practices unlikely to change on private land in the foreseeable future, habitat for these species will remain limited on adjacent lands.

Determination of Effect

Thinning and prescribed fire may harm or displace individuals, but impacts are likely to be negligible. The proposed project may cause a reduction in upland roosting habitat, but habitat for these species would continue to exist in bottomlands. Therefore, the proposed project may impact individuals but is not likely to cause a trend toward federal listing or loss of viability of this species.

Texas Emerald Dragonfly (*Somatochlora margarita*)

The Texas emerald dragonfly has a potential range that may exceed 10,000 square miles in southeast Texas, including all National Forests in Texas (Price et al. 1989). Habitat requirements are poorly understood, especially for the larvae which seem to be associated with small, clear, sandy-bottomed spring runs and streams (Linam et al. 1994). Adults forage for insects at canopy level in mature forest and over gravel roads and small openings. The Texas emerald dragonfly has been documented in the Big Creek Scenic Area of the Sam Houston NF (Price et al. 1989), which is approximately 10 miles from the project area.

Direct and Indirect Effects

Given that adults are highly mobile and that thinning and prescribed burning will not occur within larval habitat, thinning and prescribed fire will have no *direct* effect on this species.

The proposed project will have no *indirect* effects on the adult Texas emerald dragonfly. Timber harvest will not result in large clearings of mature pine, and therefore will not negatively affect habitat suitability.

Dragonfly larvae are susceptible to siltation of aquatic habitats caused by ground disturbing activities associated with timber harvest. However, management procedures employ stream buffers that will protect larval habitat from sedimentation.

Cumulative Effects

The proposed project would increase available foraging habitat for this species. Thinning overcrowded pine stands would promote accelerated growth, reducing the time it takes for these stands to develop the maturity suitable for foraging adults.

Increased road use that is associated with the proposed project may contribute to the short-term sedimentation of aquatic habitats. Roads are currently a major contributor of silt to creeks within the project area. The proposed project would incorporate the maintenance/repair of roads utilized during implementation. This would result in reduced sediment delivery to streams, and consequently improve larval habitat in the long-term.

Determination of Effect

Although Texas emerald dragonfly larvae are susceptible to sedimentation of aquatic habitats, streamside protection measures would minimize negative impacts to larval habitat. Therefore, the proposed project may impact individuals but is not likely to cause a trend toward federal listing or loss of viability of this species.

Bachman's Sparrow (*Aimophila aestivalis*)

Bachman's sparrow inhabits open, fire-maintained pine forests with grassy understories, or other open areas with thick grassy cover (Hamel 1992). Nesting occurs from mid April to late July in areas with a high density of herbaceous cover and a low density of woody shrubs (Hardin and Probasco 1983). The Bachman's sparrow has not been detected during annual bird point counts located within the project area. The species has experienced a reduced range due to declines in suitable habitat, and has become localized in many places.

Direct and Indirect Effects

The Bachman's sparrow is unlikely to occur within the project area due to the lack of suitable habitat. Therefore, thinning and prescribed fire would have no *direct* effects on this species.

Bachman's sparrow would benefit from the improved habitat conditions that would develop from thinning and prescribed burning. Thinning would reduce overstory density and open the understory to sunlight, subsequently promoting the establishment of herbaceous vegetation that would be maintained by prescribed fire.

Cumulative Effects

Suitable habitat for this species is limited in or near the project area. Adjacent private pine forests primarily lack the required grassy understory and general open conditions, and are unlikely to contribute suitable habitat for this species. In addition, existing pastureland is subjected to heavy grazing pressure that restricts the density and height of grasses required for cover.

Thinning and prescribed fire would lead to the creation of habitat that would sustain this species in the future. In addition, establishing desirable conditions may aid in the expansion of localized populations, and help restore the Bachman's sparrow to its historic range.

Determination of Effect

The Bachman's sparrow is unlikely to occur in the project area because suitable habitat is limited. Thinning and prescribed fire would improve habitat conditions. Therefore, the proposed project would have beneficial impacts to this species.

Sensitive Aquatic Species

The following sensitive fish, fresh water bivalves, and crayfish are addressed: **Western Sand Darter** (*Ammocrypta clara*), **Sabine Shiner** (*Notropis sabinae*), **Texas Pigtoe (***Fusconaia askewi*), **Triangle Pigtoe** (*Fusconaia lananensis*), **Sandbank Pocketbook** (*Lampsilis satura*), **Louisiana Pigtoe** (*Pleurobema riddellii*), **Texas Heelsplitter** (*Potamilus amphiachaenus*), and **Neches Crayfish** (*Procambarus nechesae*), ***Procambarus nigrocinctus*** (no common name), and ***Procambarus kensleyi*** (no common name). While specific habitat requirements for these species differ, these species are primarily impacted by siltation and sedimentation. Therefore, aquatic species are considered concurrently in the effects analysis.

Fish

Western Sand Darter (*Ammocrypta clara*) and **Sabine Shiner** (*Notropis sabinae*)

The western sand darter usually inhabits large streams in slight to moderate current, primarily over a sandy substrate (Kuehne and Barbour 1983). The western sand darter has not been documented on the Sam Houston NF and is only known from the Sabine and lower Red rivers. The Sabine shiner is closely restricted to substrate of fine, silt-free sand in small streams and rivers having slight to moderate current (Lee et al. 1980). Surveys conducted at a variety of aquatic sites across the SHNF failed to detect this species over four sampling periods in 1997 and two sampling periods in 1999-2000 (Herbert 1999, Healy 2002). Of the sites surveyed, Boswell, Pea, and Briar creeks occur within the project area and Roark creek and Winters bayou occur adjacent to the project area. However, these surveys did include detections of the goldstripe darter (*Etheostoma parvipinne*), a species closely associated with the Sabine shiner. This species was found in Briar and Pea creek, located within the eastern and southeastern portion of the project area, respectively. The Goldstripe darter is found in clear, sandy bottom streams that are spring fed (D. Peterson, pers. comm.). This species requires unimpeded waterways that allow passage to headwaters needed for fulfilling life cycle requirements and for survival during summer droughts. Spring run streams of this type may indicate the presence of suitable habitat conditions necessary to support the bottom dwelling Sabine shiner.

Freshwater Bivalves

Texas Pigtoe (*Fusconaia askewi*), **Triangle Pigtoe** (*Fusconaia lananensis*), **Sandbank Pocketbook** (*Lampsilis satura*), **Louisiana Pigtoe** (*Pleurobema riddellii*), and **Texas Heelsplitter** (*Potamilus amphiachaenus*)

Freshwater mussels may inhabit a variety of water-body types including large and small rivers and streams, lakes, ponds, canals, and reservoirs (Howells et al. 1996). These sensitive mussel species are generally found in large river systems in mixed mud, sand, and fine gravel (Howells et al., 1996). Mussels filter feed on algae, detritus, small particles in the water, and may be able to absorb some organic material in solution (Howells 1996). Pollution, over harvest, reduced spring and river flows, and sedimentation are probable causes of decline (Howells et al. 1996). In addition, any impacts to fish may negatively affect mussels, which use fish as hosts for larval development (Howells 1996).

Surveys conducted in 1994 and from a study conducted during 1999-2000 on the Sam Houston NF, including streams in close proximity to the project area, did not detect any of these sensitive mussel species (Howells 1994, Healy and Gelwick undated). In addition, live mussels were rarely collected in streams on the SHNF during this study. Evidence of mussels was found at 8 of 18 sites (17 streams), in which three of these sites only dead individuals or valve fragments were collected (Healy and Gelwick undated).

Crayfish

Neches Crayfish (*Procambarus nechesae*), ***Procambarus nigrocinctus*** (no common name), and ***Procambarus kensleyi*** (no common name).

The Neches crayfish and *P. kensleyi* have been found in simple burrows in temporary or semi-permanent pools in roadside ditches. *P. kensleyi* habitat requirements include sandy clay soils with grasses and sedges. *P. nigrocinctus* primary occurs amongst debris in streams with sandy or rocky bottoms (Hobbs 1990).

The Neches crayfish and *P. nigrocinctus* were not detected in 1999-2000 surveys conducted in variety of aquatic habitats throughout the SHNF (Healy 2002). These species are associated with the Neches River Basin that occurs northeast of the SHNF (D. Peterson, pers. comm.). However, *P. kensleyi* was detected within the southeast portion of the project area in Pea creek and adjacent to the project area in Winters bayou (Healy 2002).

Direct and Indirect Effects

Streamside protection measures are incorporated that exclude harvest activities within SMZ's. Stream crossings would be avoided and alternative routes used to access harvest units when possible. While prescribed fire would occur within these zones, ignition would be excluded. Prescribed fire within SMZ's would consist of generally low intensity backing fires that are unlikely to directly impact aquatic habitats. Therefore, the proposed project is unlikely to have *direct* effects on aquatic species.

The *Proposed Action* would not include the construction of any new roads; however, thinning activities and road, stream channel, or culvert restoration would likely cause increased sedimentation that may negatively affect aquatic species. Sediment may smother benthic organisms, cause clogging of gills, change water temperature, and hinder foraging (Ellis 1936, Cordone and Kelly 1961, McDaniel 1993). Any negative affects; however, are anticipated to be short-term. Adherence to *Plan* measures and project design criteria for protecting stream courses would impede movement of sediment (USDA Forest Service 1996). These measures are designed to limit sediment delivery to streams and are consistent with, and exceed, state Best Management Practices for protecting aquatic habitats from sedimentation.

Thinning and prescribed fire would decrease the susceptibility of pine stands to high intensity wildfire. High intensity wildfire may temporarily remove vegetation that impedes the movement of sedimentation into aquatic habitats. Thinning and prescribed burning would reduce fuel loads, thereby decreasing the susceptibility of pine stands to high intensity wildfire.

Although prescribed fire is permitted within SMZ's, low intensity backing fires are unlikely to remove soil stabilizing riparian vegetation. In addition, construction of fire lines that are associated with prescribed burning activities would also occur within SMZ's. However, these fire lines are hand prepared with minimal disturbance to soils, and therefore are unlikely to impact aquatic habitats.

Cumulative Effects

Implementation of the proposed project may result in short-term sediment increases to aquatic habitats. However, adherence to *Plan* measures and design criteria for protecting stream courses would minimize the magnitude of this occurrence (USDA Forest Service 1996). In addition, aquatic species would likely experience long-term benefits from the reduced sedimentation and improved water quality that would result from improved road, stream channel, and culvert drainage.

Timber harvest and cattle grazing on private lands may reduce, degrade, or cause fragmentation of suitable aquatic habitat. However, small portions of streams occurring within the project area begin outside federal property boundaries. Therefore, private land management is unlikely to affect these aquatic habitats. Downstream effects to aquatic habitats are also of concern. Management practices on national forest require measures that protect aquatic habitats from sedimentation. Therefore, the proposed project is unlikely to alter water quality downstream of the project area.

Determination of Effect

Although aquatic species are susceptible to sedimentation, streamside protection measures would minimize impacts to aquatic habitats. Therefore, the proposed project may impact individuals but is not likely to cause a trend toward federal listing or loss of viability of these species.

V. Determination of Effect

A. Federally Listed or Proposed Species

Formal consultation with the USDI, Fish and Wildlife service is not required. Implementation of the proposed project is ***not likely to adversely affect*** any federally listed Endangered or Threatened species (see Appendix A).

B. Sensitive Species

Implementation of this project ***may impact individuals but is not likely to cause a trend to federal listing or loss of viability*** for any Sensitive species (see Appendix A).

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VI. References

Personal Communications

Peterson, D. Fisheries Biologist, National Forests and Grasslands in Texas, USDA, Forest Service. Lufkin, TX. Phone conversation regarding fisheries concerns. June, 2003.

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